



UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/072,959	05/05/98	PAN	P 2919.1US

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EXAMINER

FOURSON III, G

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 10/11/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/072,959

Applicant(s)

Pan

Examiner

George Fourson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 11-17, 25-28 and 33-38 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 11-17, 25-28, 33-38 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

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1. ^{1-5,} Claims 11-17, 25-28 and 33-38 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 1, 11, 25 and 33, it is questioned what is recited through use of "substantially simultaneously". The disclosure as originally filed does not establish a meaning for the term, specifically what time interval between the steps is recited.

2. Claims 1-5, 11-17, 25-28 and 33-38 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no description in the disclosure as originally filed of separate etching processes to etch the buffer film layer in horizontal and vertical directions as encompassed by "substantially simultaneously" as discussed above. Support is seen for reducing the thickness of the layer and recessing the layer from the trench opening.

Claims 1-4, 11-14, 16, 25-27, 33-35 and 37 are rejected under 35 U.S.C. 102(e) as being anticipated by Tsai et al.

Tsai et al discloses formation of dielectric layer 32 and buffer layer 34 over semiconductor substrate 30, patterning of layers 32 and 34, trench etching using the patterned layers as a trench mask,

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thermal oxidation of the trench walls, isotropic etching of layer 34, filling of the trench with silicon dioxide in which filling step the silicon dioxide is applied directly to the buffer layer, removal of a portion of the silicon dioxide and removal of the buffer layer 34 (fig.5a-5h).

Applicant argues the reference does not disclose applying the filling material "directly" to the buffer material. However, the filling material is formed to contact the buffer layer at the recessed vertical surfaces of the buffer material.

Applicant argues that the limitation of claims 3,13,26 and 34 was not addressed in the office action mailed 10/11/2000. However, as stated in the office action mailed 10/11/2000, Tsai et al disclose isotropic etching of layer 34. Isotropic etching by definition includes etching in both horizontal and vertical directions, at least on the atomic scale. It would be expected that some localized variations in lateral etch rate would occur in such a process, at the interface with layer 36 for example, which would give rise to the recited vertical component of the etching at those location at that time. Such a process would achieve etching in both directions substantially simultaneously as recited.

Claims 5,15,28 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai et al as applied to claims 1-4,11-14,16,25-27,33-35 and 37 above, and further in view of Pan et al.

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Tsai et al does not disclose annealing of the trench fill material. Annealing of trench fill material is disclosed by Pan et al. It would have been within the scope of one of ordinary skill in the art to employ the process of Pan et al for its known intended purpose to achieve the trench filling step of Tsai et al. The instant application is not accorded the benefits of 103c as amended by the AIPA because the instant application has a filing date prior to 11/29/99.

Claims 17 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai et al as applied to claims 1-4,11-14,16,25-27,33-35 and 37 above, and further in view of the following comments.


Tsai et al discloses recessing layer 34 50-1000Å (col.5, line 36). See MPEP 2144.05.

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See figures 5A-5C of Saki 5,960,297.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist whose telephone number is (703) 308-0956. **See MPEP 203.08.**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner George Fourson whose telephone number is (703) 308-2544. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703) 308-4918. The fax number for this group is (703)308-7722(and 7724 and 7382). MPEP 502.01 contains instructions regarding procedures used in submitting responses by facsimile transmission.


George Fourson
Primary Examiner
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GFourson
September 26, 2001